

Listing of the Claims:

1. (Currently amended) A steering control device for use in a vehicle having a steering wheel that receives steering input, and an electronically-controlled steering unit that turns the vehicle's wheels over a road surface based on the position of the steering wheel, comprising:

a reaction force device coupled to the steering wheel and responsive to a control signal to apply a steering reaction force to the steering wheel; and

a controller ~~adapted~~ configured to generate the control signal in response to the movement of the steering wheel and the road surface reaction force, wherein the controller ~~varies~~ is configured to vary the control signal to increase the steering reaction force in response to the road surface reaction force, and ~~the controller determines to determine that~~ the reaction force is larger when the steering wheel is turning than when the steering wheel is returning.

2. (Currently amended) The steering control device of Claim 1, wherein the controller is responsive to the angular velocity of the steering wheel, and is further ~~adapted~~ configured to vary the control signal as a function of steering wheel angular velocity.

3. (Currently amended) The steering control device of Claim 2, wherein the controller ~~varies~~ is further configured to vary the control signal to decrease the steering reaction force at higher steering angular velocities.

4. (Currently amended) The vehicle steering control device of Claim 1, further comprising vehicle speed sensor wherein the controller is responsive to the vehicle speed sensor and is further ~~adapted~~ configured to vary the control signal as a function of vehicle speed.

5. (Currently amended) The steering control device of Claim 3, wherein the controller ~~varies~~ is configured to vary the control signal to decrease the reaction force at lower vehicle speed.

6. (Currently amended) The steering control device of Claim 1, wherein the controller is further adapted configured to calculate a vehicle state and an estimated steering force correction value based on the vehicle state, ~~wherein the controller varies~~ and to vary the control signal as a function of the estimated steering force correction value.

7. (Currently amended) The steering control device of Claim 6, wherein the controller ~~varies~~ is configured to vary the control signal to increase the steering reaction force by the steering force correction value.

8. (Original) The steering control device of Claim 6, wherein the vehicle state is calculated based on information of the vehicle speed and yaw.

9. (Currently amended) The vehicle steering control device of Claim 1 wherein the controller is further adapted configured to calculate whether the vehicle is within a rotation limit based on the angle of the wheels and the yaw rate of the vehicle, and wherein the controller ~~does~~ is configured to not reduce the steering reaction force when the controller determines that the vehicle is within the rotation limit.

10. (Currently amended) A vehicle, comprising:

- (a) a steering wheel that receives steering input from an operator;
- (b) an electronically controlled-steering device that turns the vehicle's wheels over a road surface based on the position of the steering wheel;
- (c) a reaction force device coupled to the steering wheel and responsive to a control signal to apply a steering reaction force to the steering wheel; and
- (d) and a controller adapted configured to generate the control signal in response to the movement of the steering wheel and ~~the~~ a road surface reaction force, wherein the controller ~~varies~~ is configured to vary the control signal to increase the steering reaction force in response to the road surface force when the steering wheel is turning and to decrease the steering reaction force in response to the road surface force when the steering wheel is returning.

11. (Currently amended) The steering control device of Claim 10, wherein the controller is responsive to the angular velocity of the steering wheel, and is further ~~adapted~~ configured to vary the control signal as a function of steering wheel angular velocity.

12. (Currently amended) The steering control device of Claim 11, wherein the controller ~~varies~~ is further configured to vary the control signal to decrease the reaction force at higher steering angular velocities.

13. (Currently amended) The vehicle steering control device of Claim 10, further comprising vehicle speed sensor wherein the controller is responsive to the vehicle speed sensor and is further ~~adapted~~ configured to vary the control signal as a function of vehicle speed.

14. (Currently amended) The steering control device of Claim 13, wherein the controller ~~varies~~ is configured to vary the control signal to decrease the reaction force at lower vehicle speed.

15. (Currently amended) The steering control device of Claim 10, wherein the controller is further ~~adapted~~ configured to calculate a vehicle state ~~an~~ and to estimate a steering force correction value based on the vehicle state, wherein the controller ~~varies~~ is configured to vary the control signal as a function of the estimated steering force correction value.

16. (Currently amended) The steering control device of Claim 15, wherein the controller ~~varies~~ is further configured to vary the control signal to increase the reaction force by the steering force correction value.

17. (Currently amended) The vehicle steering control device of Claim 10, wherein the controller is further ~~adapted~~ configured to calculate whether the vehicle is within a rotation limit based on the angle of the wheels and the yaw rate of the vehicle, and ~~wherein the~~

~~controller does to~~ not reduce the steering reaction force when the controller determines that the is within the rotation limit.

18. (Original) An steering control apparatus for use in a vehicle having a steering wheel and a reaction device to impose a steering reaction force onto the steering wheel in response to a steering force control signal, comprising:

steering force correction means for calculating the steering force control signal based on a road surface reaction force and a gain;

judgment means for determining whether the steering wheel is in a turning or returning mode; and

control means for setting the gain at a higher value when the steering wheel is in a turning mode.

19. (Original) A method for controlling steering in a vehicle having a steering wheel and a reaction device to impose a steering reaction force onto the steering wheel in response to a steering force control signal, comprising:

calculating the steering force control signal based on a road surface reaction force and a gain;

determining whether the steering wheel is in a turning or returning mode; and

setting the gain at a higher value when the steering wheel is in a turning mode.

20. (Original) The method of Claim 19, further comprising:

determining the angular velocity of the steering wheel; and

setting the gain at a lower value when the steering wheel has a higher angular velocity.

21. (Original) The method of Claim 19, further comprising:

determining the vehicle speed; and

setting the gain at a lower value when vehicle speed is lower.

22. (Original) The method of Claim 19, further comprising:
calculating a vehicle state value; and
estimating a steering reaction force correction value from the vehicle state value;
and
adding the steering reaction force correction value to the steering force control
signal.

23. (Original) The method of Claim 19, further comprising:
determining whether the vehicle is within a rotation limit; and
setting the gain to a predetermined high value when the vehicle is within the
rotation limit.